

ART. XIV.—*Notes on some Victorian Land Planarians.*

(With Plates XI and XII.)

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[Read December 11, 1890.]

The Planarians, with which this paper deals, were collected during the month of November by the members of a party from the Field Naturalists' Club of Victoria, which had gone out to collect in the country lying between Marysville and the source of the Yarra along the Wood's Point Road.

The country is heavily timbered, has numberless fallen logs, endless gullies, a considerable rainfall, and is eminently suited to planarian life. Certain forms were plentiful, and it may be noticed that these were principally the darker coloured ones, such as *Geoplana spenceri*, which, in parts, was found under almost every log turned over, and two new species to be hereafter described. There was a noticeable absence of the light-coloured species, in which the prevailing body colour is of a yellow tint. Such, in parts of Gippsland for example, are seen crawling about in the open, whilst not one was seen by us in this district of the comparatively common form *G. sugdeni*, and only few examples of *G. mediolineata* and *hogii*. The only light-coloured one at all common was *G. alba*, which showed numerous variations from the typical cream-white colour, the specimens varying from dark cream to a warm shade of brownish flesh-colour, sometimes being even more grey than brown. On only one occasion was a specimen seen crawling out in the open, and this was a *G. spenceri*, climbing a tree, and at a height of five feet from the ground.

Messrs. Fletcher and Hamilton for New South Wales, and Mr. Dendy for Victoria, have named the specimens as yet secured in the two colonies.

In his recent paper, Mr. Dendy\* enumerates fourteen species of *Geoplana*, and one of *Rhynchodemus*, as found in Victoria. Of these, our party secured seven species of *Geoplana*, or half the total number, and we were fortunate enough to discover two new species of the same genus, and one found in New South Wales, but not yet recorded in Victoria.

The following is the list of species found by us:—

1. *Geoplana alba* (Dendy).
2. *G. mediolineata* (Fletcher and Hamilton).
3. *G. mc'mahoni* (Dendy).
4. *G. hogii* (Dendy).
5. *G. munda* (Fletcher and Hamilton).
6. *G. sulphureus* (Fletcher and Hamilton).
7. *G. spenceri* (Dendy).
8. *G. dendyi* (sp. n.)
9. *G. walhallaæ* (Dendy).
10. *G. frosti*. (sp. n.)

The following is a brief outline of the chief points of interest, together with a description of the two new species:—

*Geoplana spenceri* (Dendy).—This was undoubtedly the most prevalent species, and seems to be characteristic of this part of Victoria. I found it for the first time under logs by the side of MacMahon's Creek, close to the Yarra; subsequently, Mr. Dendy found it in the same district, and again at Walhalla. Our collecting ground lay in a district intermediate between these two, and from the plentifulness of the worm, it is probable that we were near to the centre of its area of distribution. In regard to colour, there were considerable variations, some specimens having the typical dark, almost green-black dorsal surface, whilst others were of a decidedly lighter colour, varying from dark to very bluish-green, and at times with a slight indication of a median light stripe at the anterior extremity of the body. Though this is interesting as showing possibly a tendency towards *G. cerulea* in colour markings, there was never any difficulty in at once determining the species, and the examination of a far greater number of specimens than has yet been seen of this species, shows that it is a distinctly marked one.

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\* Transactions Royal Society of Victoria, Vol. II., p. 65.

This animal, together with the other planarians, is very destructive to insect life. It lives under logs with the curious little crustacean 'hopper,' and with various species of coleoptera and myriapoda, and the empty cases of these forms testify to its voracity. I have watched a *Geoplana spenceri* catch and eat a beetle; the latter inadvertently walked over the worm, and immediately stuck to its slime, then despite its wriggles, the planarian, with comparative speed, wrapped its body round the beetle which was soon enclosed in a slimy mess, and incapable of moving. Then the proboscis was inserted between the joints of the external skeleton, and the planarian fed at leisure.

*Geoplana mediolineata* (Fig. 15).—Of this species, which is common in parts, we only found one specimen, despite the fact that between us we upturned hundreds of logs, and searched diligently beneath the bark of many gum trees. This species is very variable. In its typical form, it has a single median stripe, with indications at the extremities of the body of two lateral stripes. Sometimes, according to Mr. Dendy, these may be continuous along the body, sometimes they may be wanting, and even the median stripe but faintly present. In our specimen, the median and two lateral ones are well marked, and in addition, there are faint indications of two additional lateral stripes.

*Geoplana dendyi*, sp. n. (Figs. 1, 2, 3, 4, and 5).—Body long and narrow; greatest length when crawling, 6 inches; width,  $\frac{1}{4}$  inch. When living and at rest, triangular in section, with a prominent mid dorsal ridge (Fig. 1A), and always lies in the form of a coil. The opening into the peripharyngeal chamber, in a spirit specimen measuring  $2\frac{1}{2}$  inches in length, was at  $1\frac{1}{2}$  inches from the anterior extremity. The genital aperture lies half way between the peripharyngeal opening and the posterior extremity. Ground colour of the dorsal surface varies from dark to light green,\* and at the anterior extremity (Figs. 2 and 4) merges into blue, and this into the orange-coloured tip. Two very light yellow bands pass along the whole length of the dorsal surface, separated from each other by only a thin, but distinctly marked, line of dark body colour. The sides of the body dorsally are covered with light spots absent

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\* In three fully grown specimens, unfortunately not preserved, the body colour was of a bright cerulean blue, and the same is true of one small young specimen. The two light stripes on the dorsal surface, and the triangular shape of the body, distinguish these from *G. cerulea*.

from a small band-like space on either side of the light lines (Fig. 3). The ventral surface varies in colour in dark specimens, being of the same green colour as the dorsal, with always larger or smaller patches of cerulean blue along the median line. In light-coloured ones, this (Fig. 5) colour may form a band along the greater part, or even the whole length, of the body, and may show indications of a median darker stripe in the mid ventral line.

This appears to be a very distinct species, and was found in considerable numbers under fallen logs, together with *G. spenceri*. It is the most abundant form along the ridge of high land separating the valleys of the Yarra from the Thompson River, and was only found in this district. Seen under the lens, the dark green or bluish skin, with its light dorsal bands and blue-white spots, is perhaps more beautiful than that of any other planarian, and I have much pleasure in naming the species after Mr. Dendy, who has already described some twelve species of Victorian land planarians.

*Geoplana frosti*, sp. n. (Figs. 6, 7, 8, and 9).—Body when at rest, flattened and leaf-like; when crawling, elongate and tapering equally at both ends. The opening into the peripharyngeal chamber, in a spirit specimen 1 inch long, lay slightly in front of the middle of the ventral surface. The genital aperture lay one quarter of the distance between the peripharyngeal opening and the posterior extremity. The dorsal surface is either dark brown (Fig. 6), or dark green (Fig. 7) in colour, in both cases with a bluish surface tinge, like the bloom of fruit, due probably to the enormous number of blue rod cells lying in the skin. Under the lens, the rods or groups of rods can be seen as fine points. The typical form has two light yellow stripes, separated from each other by a thin median dorsal line of body colour, running from the posterior extremity to the anterior orange tip. The ventral surface is light yellow in colour, though this is almost concealed by brown speckles absent along the median line, where is a well marked band of body colour, visible even in spirit specimens.

This species agrees with *G. dendyi* in its dark upper surface with two light stripes, but can be easily distinguished from the latter by its flattened form when at rest, and its light-coloured ventral surface.

One specimen found was remarkable for the slight development of the light stripes, which were only present at the posterior end, and were continuous with a slightly

lighter band along the median line, which gradually faded away anteriorly (Fig. 8). This specimen also was darker than the rest. It has a strong resemblance at first sight to *G. walhalla*, but the clear indication of the two light stripes dorsally, and the position of the genital opening, render it distinct from this species.

*G. frosti* was found only on the high land lying between the upper tributaries of the Yarra and the Thompson River, and even here was not very common; its distribution was practically identical with that of *G. dendyi*. It has been named after Mr. C. Frost, by whom the first specimen was found, and whom I have to thank for valuable assistance in various ways, both on this and on many other occasions.

*G. walhalla*, Dendy (Figs. 11, 12, and 13).—This has been already described by Mr. Dendy, who found it at Walhalla, not very far from the district in which we were collecting. It is somewhat leaf-like in shape when at rest, but in this respect forms an intermediate stage between *G. spenceri* on the one hand, and *G. frosti* on the other. When crawling, its upper surface closely resembles the former, from which, however, there is no difficulty whatever in distinguishing it, owing to its light-coloured undersurface, which is covered with brown speckles, as in *G. frosti*, though the median light stripe present in the latter, is here absent. This form and *G. frosti* are undoubtedly more closely allied to one another, than either is to *G. spenceri*, and it is figured here since Mr. Dendy was unable to represent it in the colours of life. Its distribution appears to be extremely limited. We only found one specimen, and this at the spot which we reached nearest to Walhalla.

*G. alba*, Dendy (Figs. 16 and 17).—This again has been described and figured by Mr. Dendy, and is represented here because the specimens found were of a notably dark colour for this species, to which, at the same time, they are undoubtedly referable. This belongs to the leaf-like forms (when at rest), and specimens vary in colour from almost white to orange, and sometimes brown and grey. The two figured were notable for showing a light median stripe, running the whole length of the body dorsally.

This form is widely distributed in Victoria, being recorded from the hill country extending from Macedon to the East of Mount Ellery, near the borders of New South Wales, in which, however, it has not as yet been found. It is the

most active and rapid in its movements of any planarian which I have yet seen.

*G. sulphureus*, Fletcher and Hamilton (Fig. 14).—This form has unfortunately not been figured by Messrs. Fletcher and Hamilton, but the description given by them of the colour, and the disposition of the bands, agrees so closely with this form, that it has been thought best to refer it to their species. They describe it as follows:—"Ground colour above and below of a uniformly bright gamboge yellow. In the median dorsal line, a narrow band of ground colour, bordered on either side by a dark reddish-brown line, as wide as the median stripe; external to each of them is a band of ground colour, as wide as the median stripe and its two dark bounding lines taken together; beyond which again, on either side, is an intensely black band, about as wide as the stripe of ground colour, which it bounds externally; the bands become more or less confluent just at the posterior extremity, while just anteriorly, they are obscured by the orange-red tint which colours the anterior extremity."

The specimen\* secured by us, agrees (Fig. 14) closely with this description, the outer dark bands being of a dark vandyke brown colour rather than black, and not so wide as those described above, and the ventral surface being somewhat lighter in colour than the dorsal.

This form, in all probability, comes near to *G. hogii*, as described by Mr. Dendy, but the absence of the broad greenish or greyish stripe, characteristic of the latter (typical examples of which we also found), serves to distinguish the two species.

It has not previously been recorded from Victoria, and now makes a total of four species known to be common to the two colonies.

Localities.—Mt. Wilson, Hartley Vale (N.S.W.); ridge between Thompson and Yarra Rivers (Victoria).

*Geoplana munda*†, Fletcher and Hamilton (Fig. 10).—This has been described by Messrs. Fletcher and Hamilton. The description which they give of its colours, does not exactly tally with the drawing (Fig. 8) given by them, and

\* Since this specimen was described, my assistant, Mr. Mann, has secured two others from another locality, corresponding exactly in colour markings.

† Since the above was written, Mr. Dendy has described a large colony of this form, which he found under a log on the Dandenong Ranges, Victoria. He secured no less than fifty specimens from under this one log, all agreeing closely in colour markings.

from which the animal may be easily recognised. They say, "undersurface greyish in centre, yellowish towards the margins. Above these is a narrow median dorsal line of pale olive brown, bounded on either side by a very fine dark line, external to which is a broader band of a slightly darker brown, and this is bordered externally by a very dark brown line, which gradually merges into a rather broad band of very dark brown, which fades gradually towards its outer margin."

In Fig. 10, the animal is represented for the first time in the colours of life, and may be described as follows:—The body colour is yellow (the tint being that known as Naples yellow), varying in intensity in different specimens, and being always lighter on the ventral than the dorsal surface. On the dorsal surface are, typically, four darker bands of colour. Two of these lie one on either side of the median line, enclosing between them a narrow strip of body colour; their internal edges are sharply marked, their external ones are less defined. External to the dark lines is a band of body colour, some three times the width of the median stripe, and covered with speckles of brown, which seem to spread out from the dark bands above mentioned, and to gradually diminish in number towards the external borders. External to these light bands lies, on either side, a dark brown band, somewhat wider than the former. Each may be divided into three portions—an upper, median, and lower. The upper has its internal edge sharply marked, and is always very dark; it passes more or less abruptly into the median part, which has a characteristic speckled appearance, and is bounded externally by the third and lower portion, made up of a somewhat narrow series of dark brown speckles. This lowest part varies somewhat in definition. The four dark bands are always present, but in addition to these, there may be present on either side, just where the dorsal merges into the ventral surface, a linear row of brown speckles, tending to form a dark line along each side. The brown of the bands varies from vandyke to umber.

It is of interest to note that the land planarians, so far as yet known in Victoria, may, with regard to colour markings, be clearly divided into three main groups. The first of these is characterised by a uniform light tint all over the body, varying in different localities from white to orange, or a warm shade of grey. This is represented by the common form *G. alba*, which is found apparently in all parts of



Victoria, having the widest distribution of the known forms. Possibly, from a form similar to it, the others have been derived.

The second group contains the dark-coloured varieties, in which the upper surface of the body is characterised by its dark colour—either blue, green, or brown. This may again be subdivided into two groups, one of which has a dark, and the other a light-coloured ventral surface.

The third group contains the light-coloured varieties marked dorsally by dark stripes. This again can be conveniently subdivided into two groups, the one of which has a median, and hence an odd number of dark stripes; the other having a median light line of body colour, and hence an even number of dark stripes.

The various forms yet known can hence be tabulated conveniently as follows:—

(a) Uniform light tint on upper and lower surface, no dark stripes.

*G. alba.*

(b) Dark tint (blue, green, or brown) on upper surface.

(1) Dark ventral surface—

*G. cerulea.*

*G. spenceri.*

*G. dendyi.*

(2) Light ventral surface—

*G. walhalla.*

*G. frosti.*

(c) Light tint (shade of yellow) on upper surface.

(1) Even number of dark stripes—

*G. munda.*

*G. mc'mahoni.*

*G. hogii.*

*G. sulphureus.*

(2) Odd number of dark stripes—

*G. mediolineata.*

*G. quinquelineata.*

*G. adæ.*

*G. lucasi.*

*G. sugdeni.*

*G. quadrangulata.*

*G. fletcheri.*



It remains to be seen whether the internal anatomy will reveal any corresponding relationship amongst the various forms.

## DESCRIPTION OF PLATES.

### PLATE XI.

- FIG. 1.—*Geoplana dendyi*. Large specimen  $\times 1\frac{1}{2}$ .  
 FIG. 1A.—*G. dendyi*. Transverse section of body.  
 FIG. 2.—*G. dendyi*. Enlarged view of anterior end.  
 FIG. 3.—*G. dendyi*. Enlarged view of surface of the body, to show the spotted nature of the skin.  
 FIG. 4.—*G. dendyi*. Enlarged view of the anterior end, dorsal view.  
 FIG. 5.—*G. dendyi*. Ventral surface  $\times 1\frac{1}{2}$ .  
 FIG. 6.—*Geoplana frosti*. Brown-coloured variety, at rest  $\times 1\frac{1}{2}$ .  
 FIG. 6A.—*G. frosti*. Transverse section across the body.  
 FIG. 7.—*G. frosti*. Greenish variety, moving  $\times 1\frac{1}{2}$ .  
 FIG. 8.—*G. frosti*. Dark variety, in which the dorsal light bands are feebly indicated. The specimen in this respect approaches *G. walhallæ*  $\times 2$ .  
 FIG. 9.—*G. frosti*. Ventral surface  $\times 1\frac{1}{2}$ .

### PLATE XII.

- FIG. 10.—*Geoplana munda*. Dorsal view  $\times 3$ .  
 FIG. 10A.—*G. munda*. Transverse section across the body.  
 FIG. 11.—*Geoplana walhallæ*. Dorsal surface of animal at rest  $\times 1\frac{1}{2}$ .  
 FIG. 11A.—*G. walhallæ*. Transverse section across body.  
 FIG. 12.—*G. walhallæ*. Animal in motion  $\times 1\frac{1}{2}$ .  
 FIG. 13.—*G. walhallæ*. Ventral surface  $\times 1\frac{1}{2}$ .  
 FIG. 14.—*Geoplana sulphureus*. Dorsal surface, life size.

